

- [IEEE.org](http://IEEE.org)
- IEEE *Xplore* Digital Library
- [IEEE-SA](http://IEEE-SA)
- [IEEE Spectrum](http://IEEE Spectrum)
- [More Sites](#)



[Advanced Search](#)

[Other Search Options](#)

Advertisement

[Browse Conferences](#) > [Neural Networks \(IJCNN\), The ...](#)

# An iterative approach to local-PCA

Related Articles

[Modelica - a general object-oriented language for continuous and discrete-event ...](#)

[Coordination of two redundant robots](#)

View All

3

Author(s)

[Samuel John](#) ; [Heiko Wersing](#) ; [Helge Ritter](#)

## Abstract:

We introduce a greedy algorithm that works from coarse to fine by iteratively applying localized principal component analysis (PCA). The decision where and when to split or add new components is based on two antagonistic criteria. Firstly, the well known quadratic reconstruction error and secondly a measure for the homogeneity of the distribution. For the latter criterion, which we call “generation error”, we compared two different possible methods to assess if the data samples are distributed homogeneously. The proposed algorithm does not involve a costly multi-objective optimization to find a partition of the inputs. Further, the final number of local PCA units, as well as their individual dimensionality need not to be predefined. We demonstrate that the method can flexibly react to different intrinsic dimensionalities of the data.

**Published in:** [Neural Networks \(IJCNN\), The 2010 International Joint Conference on](#)

**Date of Conference:** 18-23 July 2010

**Date Added to IEEE *Xplore*:** 14 October 2010

**ISBN Information:**

**ISSN Information:**

**INSPEC Accession Number:** 11594013

**DOI:** [10.1109/IJCNN.2010.5596615](https://doi.org/10.1109/IJCNN.2010.5596615)

**Publisher:** IEEE

**Conference Location:** Barcelona, Spain

Advertisement

## Keywords

- **IEEE Keywords**

[Principal component analysis](#), [Manifolds](#), [Histograms](#), [Image reconstruction](#), [Equations](#), [Measurement uncertainty](#), [Partitioning algorithms](#)

## Authors

[Samuel John](#)

Cognition and Robotics-Lab (CoR-Lab.de), Bielefeld University, PO Box 10 01 31, D-33501, Germany

[Heiko Wersing](#)

Honda Research Institute Europe GmbH, Carl-Legien-Str. 30, 63073 Offenbach/Main, Germany

[Helge Ritter](#)

Coordinator Excellence Cluster 277: Cognitive Interaction Technology Director Cognition and Robotics Laboratory (CoR-Lab) Faculty of Technology, Bielefeld University, 33501, Germany

A not-for-profit organization, IEEE is the world's largest technical professional organization dedicated to advancing technology for the benefit of humanity.

© Copyright 2018 IEEE - All rights reserved. Use of this web site signifies your agreement to the terms and conditions.